The Prenatal Effects of the Christchurch Earthquake on Executive Function at Five Years of Age

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Abstract

Despite the frequency of earthquakes, particularly in New Zealand, little is known about the long-term effects that they can have on vulnerable populations, such as mothers and unborn babies. This study looks at the way in which a major earthquake can impact on neurodevelopment, specifically the executive function (*EF*) abilities of children five years following the disaster. The aims of this study were to determine if prenatal earthquake exposure had an effect on EF, to determine how timing of exposure influenced EF, if there were different EF outcomes for boys and girls, and how maternal perceptions of severity influenced the child's EF. Children from two groups (mothers from Christchurch who experienced the earthquakes and mothers from Dunedin and Timaru who did not) had their EF measured by a self-administered parent questionnaire, the Behaviour Rating Inventory of Executive Function Second Edition (BRIEF 2). Maternal demographics and earthquake severity experiences were gathered through a second self-administered questionnaire. This study found that children who prenatally experienced the earthquake had significantly worse scores on the measures of emotional control and emotional regulation than the standardised average provided by the BRIEF 2. Exposure during the third trimester was associated with the most significant increases in EF compared to children exposed during the second trimester and the standardised average. In addition to emotional control and emotional regulation difficulties, Christchurch boys also exhibited significantly higher scores on the Shift scale. Results also showed that the worse someone close to the mother was injured, the higher the child's scores on the Inhibit, Organisation, and Emotional Control scale, and the Behaviour Regulation index (BRI) were. Also, children of mothers who reported more significantly injuring themselves in the earthquake had higher Emotional Regulation (ERI) scores. Children whose mothers reported being overall extremely stressed by the earthquake had the largest mean difference in emotional control and ERI scores compared to the standardised average. Despite the small group sizes and continuing aftershocks the variations in trimester and maternal perception of stress indicates that prenatal exposure to a natural disaster does impact EF.

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